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Comparatively Analysis and Design of shear wall of G+8 storey building

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Abstract*—Shear wall is a structure element which provides stability to structure from lateral loads like wind load and seismic loads. The stiffness and strength of wall may decreased by the reduction in the concrete area and the discontinuity of the reinforcement due to opening. In this paper a review is taken out over the analysis and design of RCC shear walls. Shear wall systems are one of the most commonly used lateral resisting system in high rise buildings. Shear wall have very high in plane stiffness and strength which can be used to simultaneously resist large horizontal loads and supports gravity loads, making them quite advantageous in many structural engineering application. A study has been carried out to determined the structure of RC shear wall location shear wall of G+8 storey building by changing shear wall locations. In the seismic design of building, reinforced concrete structure wall, act as major earthquake resisting members. Structural walls provide an efficient bracing system and offer great potential for lateral load resisting members. The proprieties of these seismic shear wall dominate the response of the buildings. The main focus is to determine shear wall location in G+8 story building*

Keywords—Earthquake resisting, lateral loads, RCC, Shear wall, stiffness and strength.

I. INTRODUCTION

Shear wall are the bearing wall which are generally known for its bearing capacity against various forces which affects the structure. Shear wall represent the most efficient structure element to take lateral forces acting on multi storey building and to transfer them to foundation. A shear wall is a vertical element of a seismic force resisting system that is designed to resist in plane and lateral forces and typically wind and seismic load as hear wall is stiffer in its principal axis that is in the other axis. It is consider as a primary structure which provide relatively stiff structure to vertical and horizontal forces acting in its plane. Under the combine loading condition, a shear wall developed compatible axial, shear, tensional and flexural strain, resulting in complicated internal stress distribution. In this way, load are transfer vertically to the building foundation.

II. DESCRIPTION OF BUILDING

The building that has been considered for modeling with or without elastomeric base isolated structure is the residential building in Mumbai. The following combination of structural member has been used to form the frame work of the building;-

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Table 1
Description of Building

Floors	All floors slabs considers as RCC slab with beam supporting them
beams	Predominantly conventional RCC beams have been provided which contribute in transferring slab loads and wall loads to column and resisting the lateral loads arising due to wind and seismic forces along with shear walls.
column	RCC columns have been placed at periphery of plan, mainly acting as support acting as support foe transferring the gravity loads from floors till foundation level & contributing as lateral frame formed by connection of strong beams.

Table 2
Detail description of building

Plan dimension	Rectangular shape of building have plan dimension as 16.5m X 9.9m
Building heights	The total building height above natural ground level is m and height below ground till foundation level is 4.5 m
Typical floor	1 to 4 floor are used for residential purpose. And ground floor are used for parking purpose
Terrace floor	8 floor is a the terrace floor and has been housing the mechanical equipment along with many other service equipment and parapet mounted façade cleaning equipment.

Table 3
Description of Building

SR .NO.	POINTS	DESCRIPTION
1.	Type of structure	RCC structure Stage 1- Without elastomeric rubber bearings Stage 2 – With elastomeric rubber bearings
2.	Type of Building	Residential Building
3.	Type of storey	Typical throughout
4.	No. of storey	Basement+ G+8 floors
5.	Height of each storey	Typical story height - 3m Height of base storey – 3.5m
6.	Height of building	27.5m
7.	Building plan dimension	16.5m X 9.9m
8.	Location of building	Mumbai
9.	Soil condition	Medium soil
10.	Seismic zone	Zone 3
11.	Basic wind speed	44 m/sec
12.	Structural member used in building	a Footing Column c) Beam d) Slab
13.	Passive devise used	Elastomeric rubber bearing between footing and column
14.	Grade of concrete used	Varies with member and storey
15.	Section sizes used	Varies with member and storey
16.	Seismic load analysis	As per method stated in IS 1893-2002

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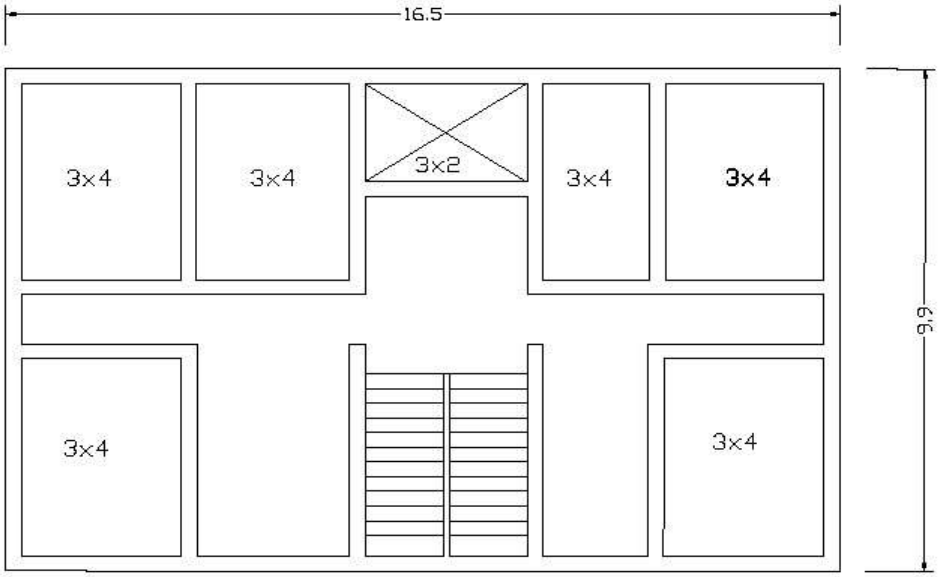
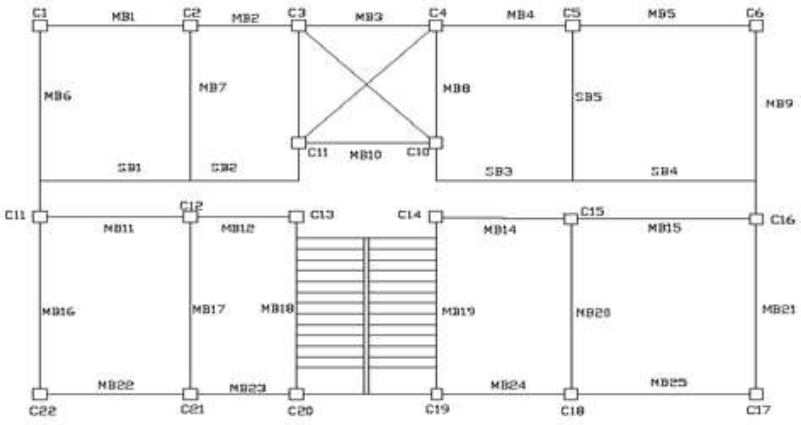
17.	Software used	a) Stadd pro. b) Auto Cad



DEVELOPED PLANE

FIGURE 1: DEVELOPED PLANE



COLUMN BEAM PLANE

FIGURE 2: COLUMN BEAM PLANE

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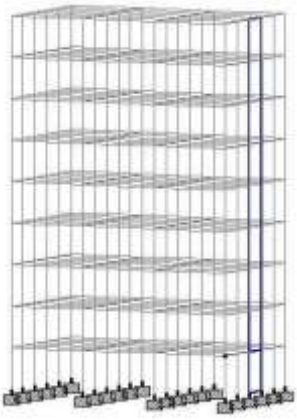
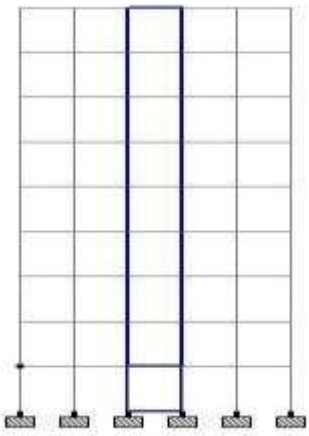
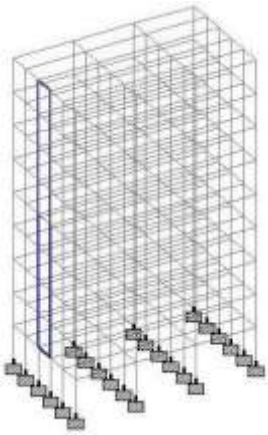
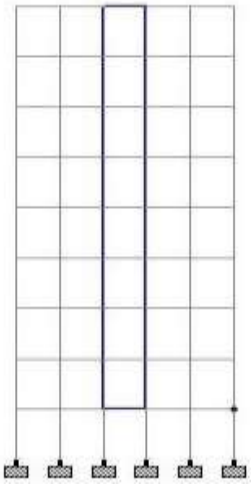
I. III. METHODOLOGY

TABLE 4
LOCATION OF SHEAR WALL

3D VIEW	SECTIONAL VIEW	REASON
		To resist lateral stiffness caused by wind or earthquake so that deflection are within the limits
		For lifts large strength and stiffness in the direction of orientation, which significantly reduces lateral sway of building and thereby reduce damage to structure and its content

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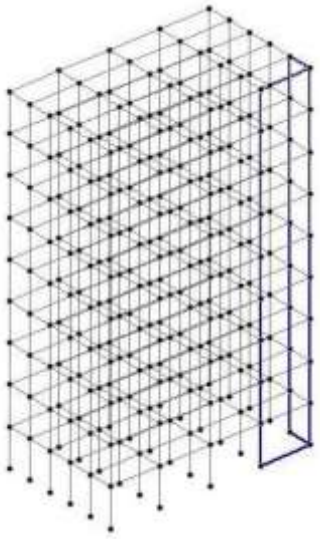	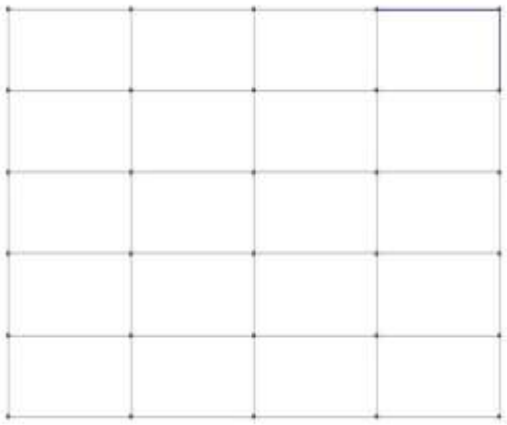	Ground acceleration in earth quake is like the inertial force for creating instability in the structure

A. *IV. CONCLUSION*

The zone selected for Earthquake resistant structure was zone 3 in which the RCC building. Is subjected to various loads like wind load, undulations, lateral displacement and more which was resist by shear wall .In which different locations are selected for effective results which is analyzed and design by IS 1893-2002 (part 1) and STAAD PRO simultaneously and a location is selected and shear wall for respective zone is selected and thus conclude that shear wall analysis through STADD PRO and theoretically are equally verified and shear wall stabilities and strength at different locations are design

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